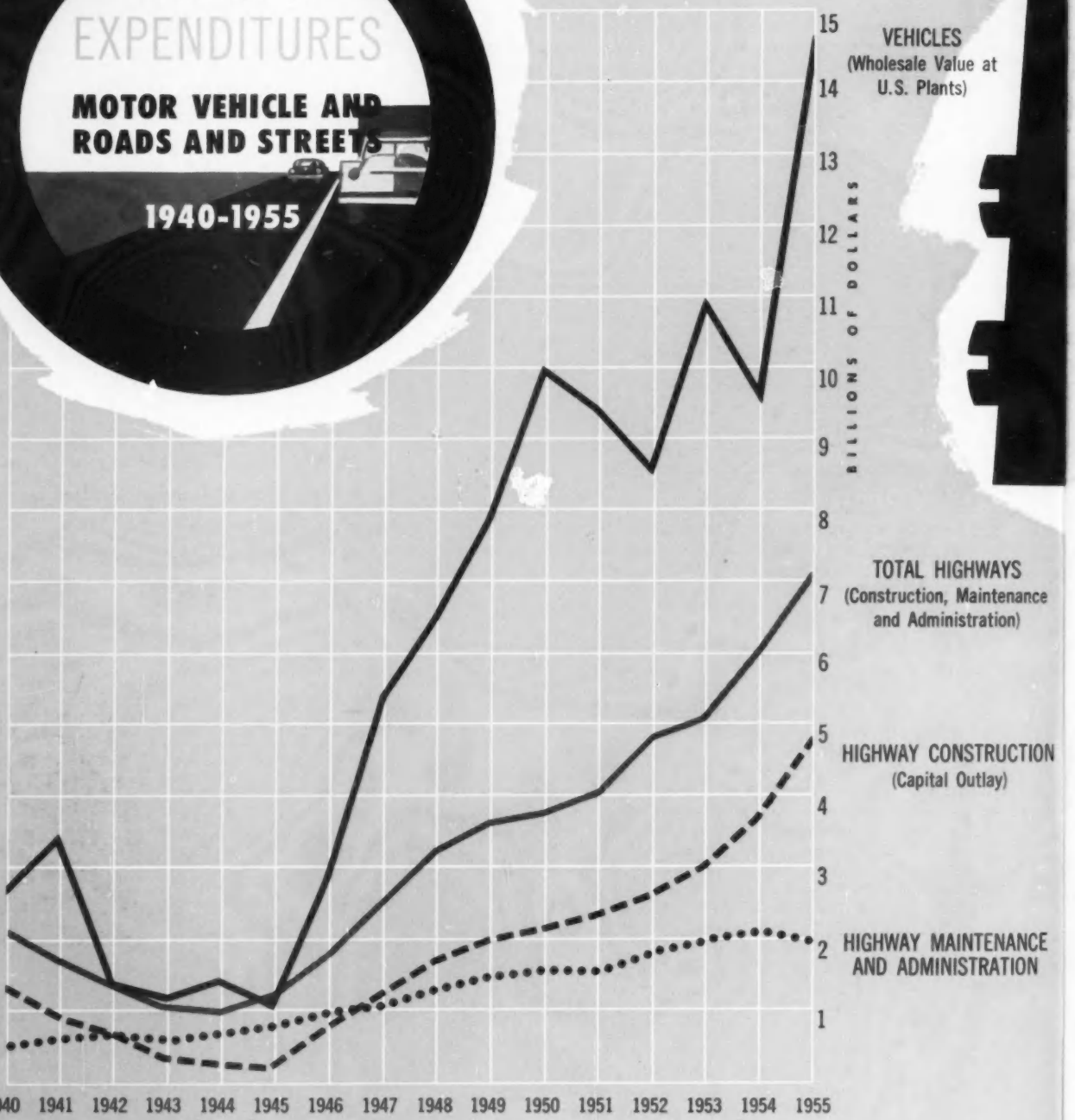
ASPHALT INSTITUTE *Quarterly*

OCTOBER, 1956

ANNUAL EXPENDITURES

MOTOR VEHICLE AND ROADS AND STREETS

1940-1955



1955 VEHICLE EXPENDITURES — $14,473,844,000

1955 HIGHWAY EXPENDITURES — $7,160,000,000*

(Capital Outlay — $4,862,000,000 — Maintenance and Administration — $2,298,000,000)

** Preliminary estimate*

SOURCES: Automobile Manufacturers Association and U.S. Bureau of Public Roads CHARTED BY THE ASPHALT INSTITUTE OCTOBER 1956

Paving The Interstate Highway System

Proposed completion by 1969 of a 41,000-mile interstate system of superhighways promises a public works program of such magnitude as to dwarf previous projects in all history. For sheer volume of earthwork, the excavation of Panama, Suez and all other canals combined seems small indeed. In length alone this vast network is nearly equal to the entire Roman road system which required 500 years to construct and was but a series of narrow paths compared to the multiple-lane thoroughfares of present design. In quantities of masonry for hundreds of thousands of bridges, retaining walls, grade separations and allied structures there simply is no precedent.

In making such comment, the intent is not to belittle accomplishments of earlier builders, who wrought so very well with limited equipment and few materials. Rather it is to emphasize that only by reason of the extraordinary machines and material techniques now available is it possible to plan a successful conclusion for such an undertaking in the brief period of scarcely more than a decade. Building the Roman roads secured an empire. Completion of the interstate system, supplemented by simultaneous construction of many additional thousands of miles of primary and secondary feeder roads, will transform America far beyond anything now dreamed. Effect upon housing, location of industry and methods for distribution of goods will be profound. Long-range planning, well underway by far-sighted leaders of the business world, already indicates some perception of what it will mean when the equivalent of 350 New Jersey Turnpikes traverses the country in one gigantic super-road net.

Implementation of this great program will require a lot of money. At first thought, the estimated 28 billion dollars would seem ample, but careful analysis indicates that only by the most careful economy will it be enough to finish the work in the time proposed. Many items of cost are more or less fixed. For example, some entirely new rights-of-way will be required over most of the mileage to meet established standards for controlled access, alignment and grade. Structures must be adequate to meet nature's dimensions of rivers and slopes. It is fortunate indeed, then, that by reason of rather recently perfected developments in both the science of soil mechanics and specialized equipment, construction of the interstate system with heavy-duty asphalt pavement can result in savings approaching $3 billion under the cost of comparable rigid designs.

New roadbeds placed as continuous embankments, fully controlled with respect to both ground-water level and surface drainage, will have such high bearing power that bases and pavements can be materially reduced in thickness. The resulting savings can be utilized either to insure earlier completion or to build wider pavements, a safety item only just recently receiving the attention it deserves. In 1910, an 8-foot lane was adequate for the Model T Ford. In 1930 a 10-foot lane was sufficient. But today, with wider cars and trucks moving continuously in adjacent lanes at speeds of 50 miles per hour and more, the 12-foot interstate minimum in some cases is not enough, especially near large cities. Already one state has increased the lane width to 13 feet, with 10-foot-wide shoulders, for all express highways. Even this may prove to be inadequate by the time 1975 rolls around.

For too long we have been obliged to design today's roads today. Now for the first time we can really plan for tomorrow on a scale commensurate with need. As part of this planning, utilization of inherent foundation strength through use of natural soils and aggregates should be employed to the fullest extent, not only for the sake of economy, but because this procedure will provide the most satisfactory qualities in the finished pavements.

—BERNARD E. GRAY

ASPHALT INSTITUTE Quarterly

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EDITOR
Richard C. Dresser

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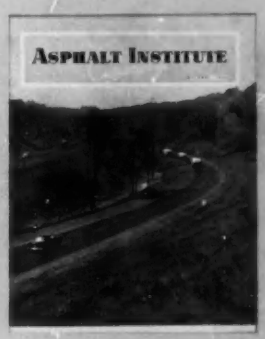

The Washington National Pike (U.S. 240), pictured here near Hyattstown, Maryland, is a modern, highspeed asphalt-paved superhighway. It provides for the American motorist the maximum in smooth, comfortable and safe driving. Its economical asphalt pavement, tough, rugged and long lasting, is designed to take the pounding of the heaviest traffic of today and the future.

Photo: Maryland State Roads Commission

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The Member Companies of the Institute, who have made possible the publication of this magazine, are listed on page 15.

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ASPHALT PLAY AREAS

RANKING first in importance in the well-regulated American community is the provision of adequate facilities for the formal training and education of its youth. The phenomenon of increasing birthrate dictates this requirement and automatically places school construction and maintenance at the head of most lists of community budget items each year.

The matter of building a school, however, does not stop at completion of a partitioned edifice for classrooms. Here, properly taught, the child will learn the "three R's," the acquisition of which constitutes a vital part of his education.

But not all of it, of course. The old adage "All work and no play . . ." holds as true today as it ever has, and educators wisely recognize that the formal education of a child must extend beyond the boundaries of the classroom to the field of play. Here, under supervised programs of physical education, delinquency is fought, fair play is fostered, and the values shaped from clean, hard competition are acquired. So important is this training considered that many schools and colleges require students to participate in several hours of athletics each school week.

Consequently, the construction of indoor and outdoor recreational facilities is a primary consideration in any community-improvement program for youth. Innumerable economy-minded school authorities and recreation experts, having experienced the high cost of maintaining grass turf, have turned increasingly to the use of asphalt surfaces for many types of outdoor play areas. The results generally have proved eminently satisfactory.

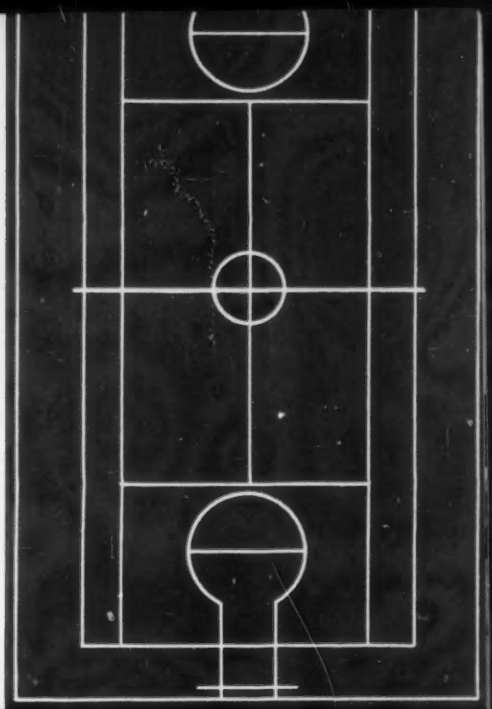
Recreation authorities agree that nothing can take the place of turf as the ideal surface for many organized outdoor games. Football, baseball and other similar sports, the rules of which call for body contact, tackling, sliding and falling, will always require the relatively soft, resilient surface that turf provides.

Yet there are several other types of games and recrea-

Newest playground in Miami, Fla., is Grapeland Heights Recreation Center. Here children enjoy basketball on tough, smooth asphalt courts.

Photo: City of Miami News Bureau

SMOOTH ECONOMICAL DURABLE



A game of soccer on asphalt playground economically installed by Los Angeles Board of Education.

tion where a relatively hard surface can serve as an adequate and desirable substitute for grass. Such traditionally indoor games as basketball can be, and are, played outdoors on courts surfaced with a smooth, all-weather asphalt pavement which, properly installed, requires no maintenance at all for many years. Other low-organized games for children are played on hard surfaces equally as well as they are on turf. And pavements under such playground equipment as swings and see-saws have replaced turf in schoolyards and community playgrounds in all parts of the country.

ASPHALT'S ADVANTAGES

Asphalt-paved playgrounds and recreation areas are by far the most popular type. As in the road-paving field, asphalt construction is the predominant choice by virtue of its versatility and its economy of construction and maintenance. These are its chief attractions, although there are other well-known advantages which make it the natural selection for multiple-use playgrounds and game courts. Resiliency and flexibility, for example, are necessary qualifications for the play area; both are inherent features of asphalt pavement, permitting its placement as a smooth, continuous surface unmarred by joints. This is particularly important because, as school and recreation authorities agree, most accidents on play areas result from stumbling. The smooth, skid-resistant surface of an asphalt playground helps reduce stumbling and resulting injuries.

Asphalt's versatility permits construction of a wide variety of excellent surfaces. Because the element of loading, a major consideration in designing roads, for all practical purposes can be dismissed from playground construction, there literally exists an asphalt surface to fit almost any budget. Least ex-

Under slides and swings resilient asphalt pavement has proved an admirable substitute for turf. Maintenance over many years of service is negligible.

Langdon Park asphalt game courts in Washington, D. C.

pensive is the simple surface treatment with light aggregate cover merely to waterproof, to eliminate dust, and to provide an even surface. With natural soils which drain well, after compaction the pavement may be placed directly upon them without foundations. In cases where more ample funds are available, it may be desirable to employ mixed-in-place surfaces. More expensive and desirable, but still much less costly than rigid, slab-type pavements, is the plant-mixed surface, laid either hot or cold.

ADEQUATE DRAINAGE A "MUST"

Most of the principles and procedures of asphalt construction employed by street and highway engineers apply in the construction of playgrounds. Among the most important is the necessity for installing adequate drainage. Unless the foundation is free draining, sub-drainage should be provided through the use of a porous sub-base such as sand-gravel, stone, slag or coarse cinders or by a system of tile or perforated pipe drains which will quickly lead water away from the foundation. Failure to do this and to insure adequate compaction to eliminate water pockets will lead to trouble later, especially in areas where alternate freezing and thawing are common during winter months. Good construction practice with respect to foundation preparation is a basic first step toward a satisfactory, completed job.

Attention must also be paid to surface drainage after the pavement has been applied. This is best obtained by placing the asphalt surfacing on a select slope, with the entire area draining toward the outside edge. As this is not always pos-

sible, either because of the size of the area or its topography, catch basins should be installed at appropriate points and the surface sloped accordingly.

STAGE CONSTRUCTION

The technique of asphalt stage construction is still another common road-building practice adaptable to playground construction. Perhaps, for example, the recreation board wants to pave a play area immediately but does not have the funds to construct a high-type, plant-mix surface. The logical solution is to apply a thin asphalt surface treatment, which will provide more than adequate service for active youngsters for months or even years. Later, when more money becomes available, the project can be completed by placement of a plant-mix surface. This method has proved most desirable and satisfactory, as all the values of the original construction are conserved. The result is a play area as strong and long lasting as one on which the heavy-duty pavement was placed during original construction.

Several other advantages of asphalt pavement supplement those already mentioned. The speediness of asphalt construction is an especially desirable one, particularly in the paving of school yards where the distraction of workmen and equipment can play havoc with pupils' concentration on studies. And, obviously, the sooner the job is done, the sooner the installation can be put to use, a frequently important factor in crowded tenement areas. As no long curing period is required, all types of asphalt surfaces are ready for play almost immediately after placement.

Ease of cleaning is another advantage offered by asphalt pavement. The surface may merely be washed down with water and swept with heavy-bristle brush brooms to clear it of debris. It is immediately ready for service after artificial wetting or rain.

Nothing is more annoying than a playing surface that reflects the harsh glare of the sun. The dark surface of an asphalt pavement, in absorbing much of this glare, reduces squinting and eyestrain. The natural resiliency of asphalt pavement lessens foot and leg fatigue, too, and there is less abrasive wear on shoes than that experienced on other pavement types.

EXCELLENT FOR TENNIS COURTS

On tennis courts, where proper play of the game depends almost solely upon the true bounce of the ball, asphalt surfaces have performed exceptionally well. As smoothness, of course, is the all-important factor—a feature for which asphalt pavements are noted—special care must be taken to provide a surface that is absolutely free from irregularities. As with other types of play areas, adequate preparation and drainage of the foundation are necessary requirements in the construction of a good court. Where funds are limited it is much better to place a low-cost surface than to neglect the foundation. Proper sloping for adequate surface drainage is also essential.

Various surface types ranging all the way from surface treatment to hot-plant-mix are suitable for tennis court construction. For added resiliency, builders often apply surfaces composed of an asphalt-fiber or asphalt-cork mixture. By admixture with pigments or application of a colored aggregate cover, a variety of colors to suit any taste may be obtained. The result is a fast, true and attractive all-weather court, available for playing immediately after a rain and unaffected by frost.

A well-constructed asphalt play area of any type will serve for years with little or no maintenance. When the surface eventually does require attention to restore smoothness, an economical surface treatment is usually all that is necessary. Installations of rigid pavement, when chipped and scaled, may also be rehabilitated inexpensively by application of an asphalt surface.

The Asphalt Institute booklet *Asphalt Sidewalks, Playgrounds, Tennis Courts and Swimming Pools* (C.S. 83) contains useful construction and design information on recreation areas. The same information is also included in *The Asphalt Handbook*, Chapter IV. Readers are invited to inquire at their nearest Asphalt Institute office (see list on page 15) about these publications.

This battery of all-weather asphalt courts at University of California offer ideal playing surface for tennis enthusiasts among students and faculty.

Asphalt-cork composition surface on courts of E. R. Squibb & Sons, New Brunswick, N. J.

There's an ASPHALT PAVEMENT for your SERVICE STATION

by Merritt R. Royer

District Engineer, The Asphalt Institute

SERVICE STATION driveways and parking area constructed with economical and durable asphalt pavement are not only striking in appearance but also are easy and economical to maintain. These are facts which many oil companies have learned during the past several years, and in most new construction of service stations today asphalt pavements, primarily the asphaltic concrete type, are being installed. In the present highway construction boom, the petroleum industry will naturally build numerous new stations to serve a great 41,000-mile road network. These new areas will constitute a fairly sizeable paving market for asphalt, one of the industry's own most important products.

ASPHALT PAVEMENT TYPES

Three major types of asphalt pavement are being used for surfacing service station driveways and parking areas, with selection determined by available sources of material and local paving practices.

Economy Type. For inexpensive driveways where budgets are limited, a properly compacted stabilized base with a minimum depth of 6 inches can be surfaced with a bituminous prime and double asphalt surface treatment (Asphalt Institute Specifications S-2 and S-5). This will assure a dust-free pavement that will perform satisfactorily for a long period of time if adequately maintained. This type of construction can be used in nearly every part of the country. As it requires no large equipment investment, many small contractors have the necessary tools to do the job.

Intermediate Type. Where reasonably sound crushed aggregates are available, it is possible to construct a most satisfactory crushed stone base with liquid asphaltic material as a stabilizer and binder. The asphalt binder resists displacement of the aggregate particles and yet imparts sufficient flexibility to enable constant contact of the base with subgrade soils. For best performance an asphalt mat should be provided for the pavement surface. This may be a cold-mix type (Asphalt Institute Specification RM-2). A well constructed pavement of this kind will provide many years of trouble-free service.

High Type. The most common service station pavements

Neatness, durability, utility—these are but three of the advantages asphalt pavements afford service stations like this one in Minneapolis.

are constructed with crushed stone bases either of the water-bound or asphalt macadam type. Both provide ample support value for a hot-mix asphaltic concrete pavement, the surface designed for heaviest-duty service. Pavement thickness of the asphalt plant mixes may range from one to three inches (see Asphalt Institute Specifications A-2-a or A-2-b).

GOOD CONSTRUCTION PRACTICE ESSENTIAL

Mandatory in any type of pavement work is good construction practice. Shoddy workmanship not only proves expensive but reflects badly both on the contractor and the materials he uses.

Service stations, unfortunately, are often located on old waste areas that have been improperly filled and cluttered with debris. For thorough compaction of soils in these earth fills, all objectionable material such as tin cans, logs and brush must be removed. Although company engineers responsible for service station construction have been hard-pressed to develop sufficient specifications and control to insure construction of a well compacted, stable earth fill on which driveway pavements can be successfully built, much progress has been made toward this end in recent years.

BASE COMPACTION AND SURFACE PLACEMENT

Too few contractors and engineers are sufficiently aware of the many advantages to be gained from compacting a stabilized base to the highest possible degree of density. This can be done only through homogeneous dispersal of an adequate amount of moisture throughout the aggregate for proper lubrication of the material when compacted by vibratory tampers or pneumatic-tired rollers. When pneumatic-tired rollers are used for consolidation, each successive lift of base material should not exceed 3 inches in thickness unless the rollers are the extremely heavy type. Use of a pneumatic-tired roller is preferable to a smooth-faced steel roller since it is most difficult to lay base materials smoothly enough to prevent bridging by the latter.

Following placement of the base, sufficient time should be permitted to elapse for adequate curing to a point where moisture content remaining in the base material has been reduced to an amount not to exceed 60 percent of the optimum (optimum moisture for many crushed limestone base materials will range from 7 to 9 percent). To water-bound bases an asphalt prime coat of .2 to .35 gallon per square yard should be applied. A slight moistening of the surface beforehand will overcome dustiness and permit freer movement of the asphalt into the pores of the base. As for asphalt macadam bases, there will be sufficient asphalt on the surface to furnish a satisfactory bond between the base and wearing surface. In some cases, however, a light tack coat may be needed. Within twenty-four hours after priming, the wearing surface may be applied.

Pneumatic-tired rollers have proved excellent in compacting all types of asphalt pavement surfaces. They not only aid in increasing pavement surface densities, but their kneading action also tends to seal and consolidate surface aggregate particles, providing a tough, smooth heavy-duty pavement that will stand up for years under daily traffic. Placement of an asphalt surface on the areas adjacent to or surrounding gasoline pump islands, however, is not recommended.

ASPHALT CURBS—DURABLE, ATTRACTIVE, LOW-COST

A highly popular and useful asphalt structure—one that has been used extensively and with great success in road and street construction—is the asphalt curb. The performance of these durable and attractive curbs has been most satisfactory in those service stations that have installed them. Modern curbing machines can place them quickly and at extremely low cost in a variety of shapes and sizes to suit any need. Requiring little or no maintenance at all, well built asphalt curbs do not scale or crack, and ice-melting salts won't harm them. They also can be painted any desired color. An examination of the excellent record of these structures, and particularly their construction economy, should convince any service station owner and prospective builder that asphalt curbs are the type to put in, along with an asphalt pavement.

Engineers must take into account such indispensable objects as pipes and tanks when planning the service station pavement. All unwanted debris should be discarded from fill before constructing base.

Adequate base compaction is a prime requirement for well built pavement structure. Either steel-face or pneumatic-tired rollers can be used.

Economical asphalt surface is easily and quickly placed. This is a plant mix type. Maintenance, when required, is low cost and rapidly accomplished.

Asphalt curbs like those bordering safety islands, pumps, and parking area of this New Hampshire station are sturdy, attractive and extremely economical. Quickly placed by machine or hand, they require little or no maintenance.

FOR 181 MILES OF THE KANSAS TURNPIKE

THEY CHOSE ASPHALT PAVEMENT

By Charles V. Owen
Area Engineer, The Asphalt Institute

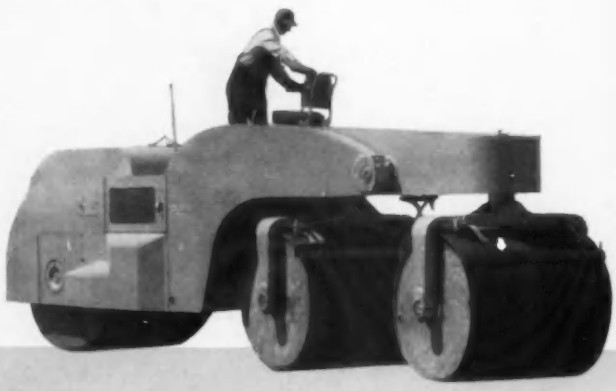


Photo: Barber-Greene

ALTHOUGH it appears that the ten-year-old boom in turnpike construction is nearing an end, it has been these great pay-as-you-go superhighways which have demonstrated most spectacularly to engineers and public alike the feasibility and efficacy of heavy-duty asphalt construction for main traffic arteries and expressways.

The trend to asphalt paving in toll road construction was set in 1947 when the original 45-mile section of The Maine Turnpike opened to traffic. Since then, eight states have jumped on the asphalt bandwagon, with pavement performance on those turnpikes now in service having proved beyond a doubt what most highway engineers have long known and recognized—that either for light-traffic or heavy-duty road construction, asphalt pavements have no equal. What began in Maine was repeated on other great superhighways—the New Hampshire, New Jersey and Turner (Oklahoma) Turnpikes, the Garden State Parkway and the Maine Turnpike Extension—and engineers building the Massachusetts, Florida, Connecticut, and Richmond-Petersburg turnpikes have prudently and enthusiastically followed the lead.

Far from the least of these huge projects, and the one next scheduled to open its twin roadways to the traveling public (on October 15, 1956), is the Kansas Turnpike. This giant, 236-mile project angles across the Sunflower State from Kansas City to the Oklahoma border. And the 181 miles of it between Topeka and the Oklahoma border are asphalt-paved.

$160,000,000 PROJECT

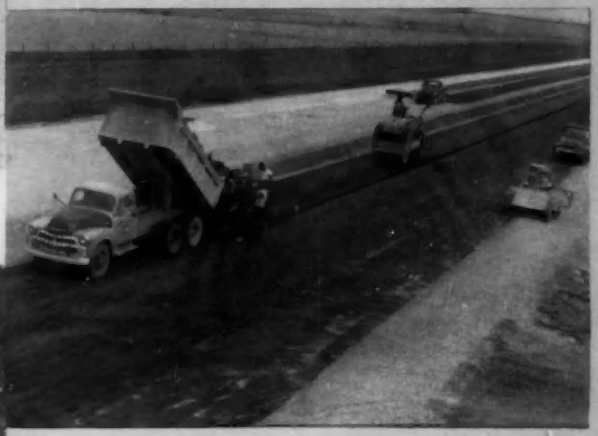
The Kansas legislature created the Kansas Turnpike Authority in 1953, empowering it "to construct, maintain, repair and operate turnpike projects and to issue revenue bonds of the Authority, payable solely from revenues to finance such projects." After the usual economic studies indicated that potential net revenue would be adequate to amortize the cost of a toll road, detailed investigation of the engineering aspects of the route (see map) were undertaken.

Photogrammetric surveys helped establish a fixed location and grade to enable sound engineering estimates of cost and, on September 22, 1954, a $160,000,000 issue of the Kansas Turnpike Authority's 3⅜ percent revenue bonds was sold at public offering to finance the project. Fourteen engineering firms began preparing for the highway's construction in October of that year; two months later the first of two

Paving machines working in tandem place heavy-duty asphalt binder course on portion of 181-mile section of Kansas Turnpike.

50-ton roller compacts the 10-inch sand-gravel sub-base.

Placement and rolling of binder course are accomplished simultaneously, demonstrating speed of asphalt construction.

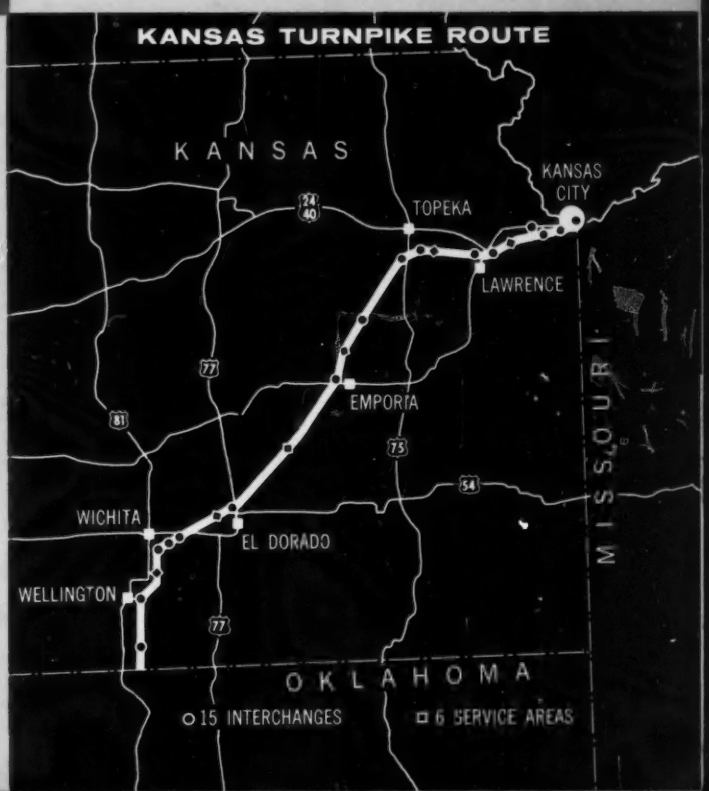


hundred construction contracts was awarded. On December 3, 1954, after hearing comprehensive presentations by The Asphalt Institute and rigid pavement advocates, the turnpike authority made public its decision to pave 76 percent of the expressway with heavy-duty asphaltic concrete.

ASPHALT'S ADVANTAGES STUDIED

The Authority reached its decision only after studied evaluation of the considerable advantages of asphalt pavement and a long look at the fine performance records of other existing asphalt toll roads and superhighways. Studies of soil conditions and availability of local materials also convinced the officials that asphalt pavement would be completely suitable for the great bulk of the turnpike's mileage, covering both the Northeast-Southwest and North-South legs. The distinctive feature that enables engineers to employ materials found along or near the right-of-way is one of the prime advantages of asphalt construction. It means that its initial cost is almost always lower than comparable rigid type construction which generally requires ex..ensive aggregates often hauled in from great distances.

Determination of thickness design of the pavement struc-



ture followed additional analysis of climatic conditions and anticipated traffic weight and volume. The design accepted by the Authority called for a 1½-inch asphaltic concrete surface over a 2½-inch asphaltic concrete binder course. The pavement is supported by an 8-inch crushed stone base and a 10-inch sub-base, also of crushed stone. Both 24-foot roadways are designed to carry single axle loads up to 36,000 pounds.

CONSTRUCTION PROCEDURE

After grading and compaction of the subgrade to specifications, the engineers selected materials ranging up to 2 inches in size for the sub-base and base courses. The materials consisted of crushed stone, gravel, chat and sand bonded with material mortar to achieve uniform plasticity. To insure thorough drainage and maximum lateral support, sub-base and base were extended full width to each shoulder slope. Construction methods involved road-mixing and spreading with blades and mechanical spreading of crusher-run and pit-run materials. In some cases mechanical spreaders successfully placed the 10-inch sand and gravel sub-base after numerous tests proved that uniform densities could be obtained. To all base construction a prime coat of medium-curing cutback asphalt was applied.

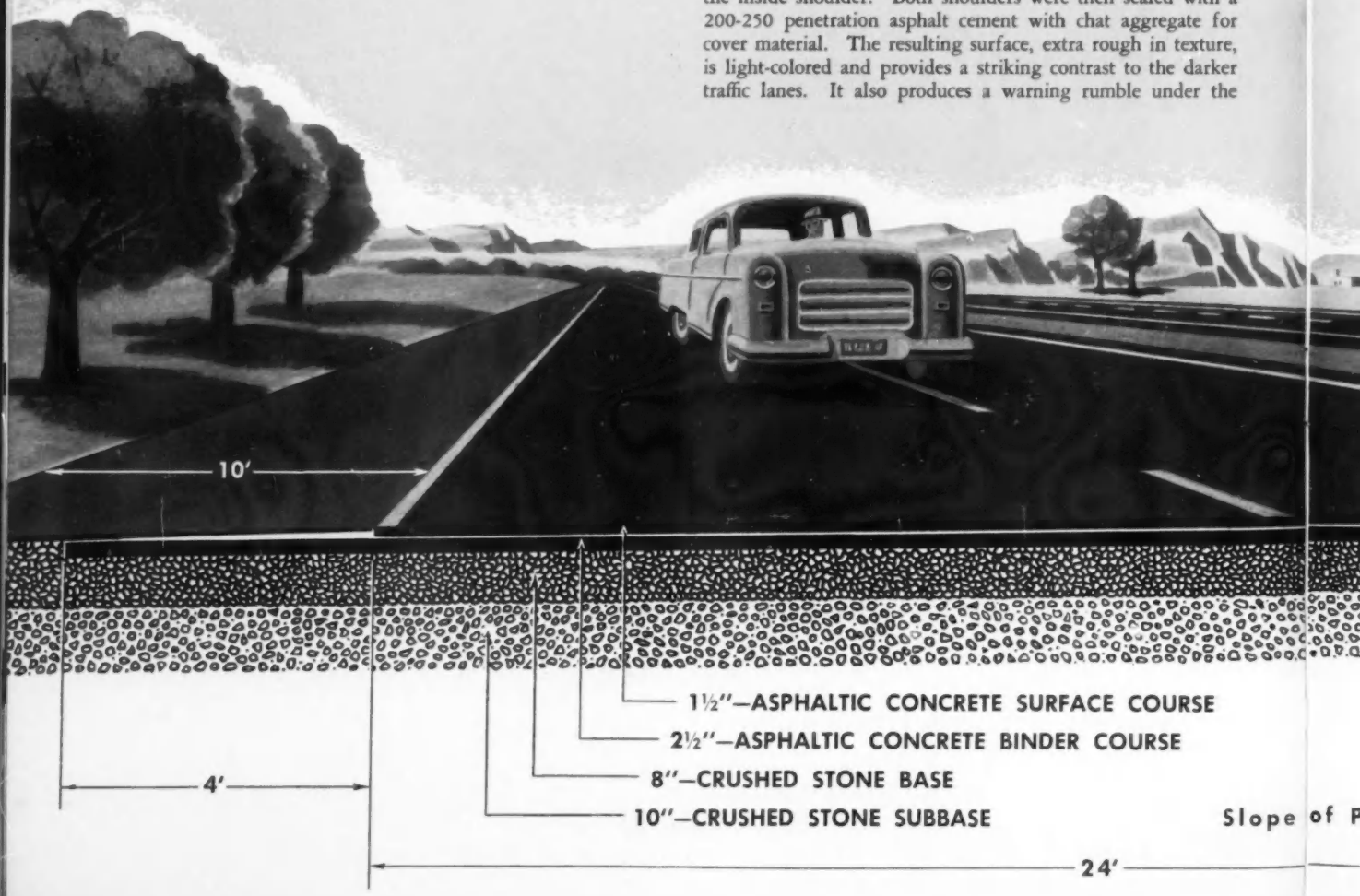
Carefully controlled laboratory tests established the mix design for the 4-inch asphaltic concrete pavement. Hot aggregate, mineral filler and 70-85 penetration asphalt cement were accurately proportioned in batch and continuous-type hot-mix plants with capacities of 150 to 200 tons per hour. Self-propelled finishing machines laid the binder and surface courses. Drag brooms with stiff fibre bristles attached to the pavers assured a sandpaper texture of high skid-resistance.

Rolling the pavement was accomplished in three operations. An eight-ton, two-axle tandem roller was used in the first, or "breakdown," operation. Then followed compaction by self-propelled, pneumatic-tired rollers while the mix was still warm and slightly plastic. For final rolling, a three-axle, twelve-ton tandem roller was employed, this operation continuing until required pavement density was obtained.

PAVING THE SHOULDERS

An important and significant feature of the Turnpike is its paved shoulders. The desirability of paving both inside and outside shoulders with asphalt was a major finding of the famed WASHO road test. It was clearly shown on the Malad, Idaho, test loops that economical, asphalt-paved shoulders develop the full inherent strength of the pavement and materially reduce the cost of pavement maintenance. And the extra paved width contributes greatly to highway safety.

Recognizing these advantages, the Kansas Turnpike engineers extended the 2½-inch asphalt binder course 4 feet beyond the 24-foot roadway on the right shoulder and 2 feet on the inside shoulder. Both shoulders were then sealed with a 200-250 penetration asphalt cement with chat aggregate for cover material. The resulting surface, extra rough in texture, is light-colored and provides a striking contrast to the darker traffic lanes. It also produces a warning rumble under the



Heavy-bristle brooms attached to spreader provide desired skid-resistant texture to asphalt pavement surface.

wheels of vehicles that stray off the heavy-duty roadway.

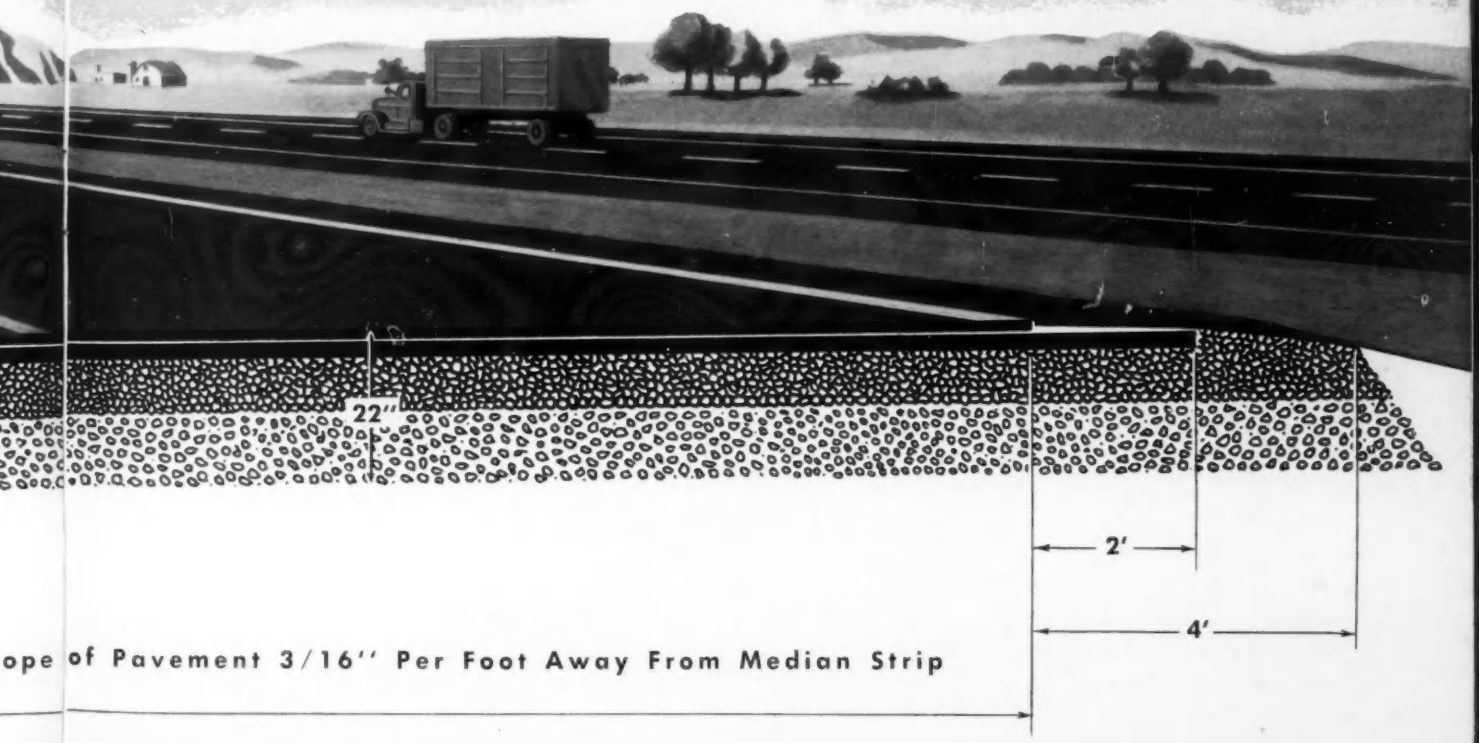
BUILT-IN SAFETY

Engineered for safety as well as riding comfort and convenience, the new Turnpike is designed for a speed of 70 miles per hour. The 20-foot median strip, the dimension of which includes the inside shoulders, provides adequate space between roadways for emergency stopping and protects drivers from headlight glare from the opposite lanes. Maximum curvature is 3 degrees, permitting a minimum sight distance of 750 feet in all rural areas. Maximum grade is 3 percent. Reflectorized guideposts delineate all curves and mark fills between ten and fifteen feet, with steel plate or cable guardrails used at all fills of more than fifteen feet. Also contributing to the safety of the driver traveling this modern, highspeed route are those characteristics inherent in asphalt pavement—its low-glare, skid-resistant surface and the sharp contrast it provides for surface traffic markings.

OUTSTANDING MODEL FOR INTERSTATE PLANNERS

The people of Kansas have a great highway project they can view with excelling pride. Its pavement is built to interstate standards, meaning that it is designed to carry the heaviest traffic loads and volume of today and the future. For 181 miles the Turnpike is paved with the most economical, durable and smoothest-riding surface known—heavy-duty asphalt pavement.

Highway planners and engineers in Kansas and other states, faced with construction of the great 41,000-mile National System of Interstate and Defense Highways, can now look to the Kansas Turnpike, in addition to other famed asphalt toll roads, to measure and compare the advantages and successful performance of asphalt pavement against any other type. When the points are all added up, there should be no doubt about asphalt's overall superiority for heavy-duty highway construction.



McKeagney Promoted to Division Engineer

ON JULY 1, 1956, Robert B. McKeagney took over the duties of Division Engineer for The Asphalt Institute's Atlantic-Gulf Division with offices at 1270 Avenue of the Americas, New York City. Mr. McKeagney succeeded to the post previously held by Herbert Spencer, who retired on that date.

A native of Quincy, Massachusetts, and a graduate of the University of New Hampshire in 1942 with a degree in geology, Mr. McKeagney joined the Institute in 1954 as New England District Engineer with headquarters at Boston. From 1942 to 1954 he served with the U. S. Army Corps of Engineers at Boston, Norfolk and Richmond, Virginia. As Chief of the Paving and Materials Section of the East Ocean Division, he designed airfield pavements in Canada, Greenland, Iceland, The Azores and Bermuda. He also served as advisor to the Construction Division, supervising a pavement training course for field personnel.

In his new post Mr. McKeagney administers engineering activities in a far-flung territory that covers twenty-one states presently served by eight Institute District Engineers. With increased and intensified highway construction placing a heavy demand upon the services of all Institute engineers, the Atlantic-Gulf Division has at its helm a man admirably endowed with the necessary engineering and executive abilities to cope with the complex problems imposed by greatly stepped-up national and local road-building programs.

Mr. McKeagney's association memberships include the Highway Research Board, the Association of Asphalt Paving Technologists, the Society of American Military Engineers, the American Institute of Mining and Metallurgical Engineers, and the Geological Society of America.

21 C. E. Instructors Attend Advanced Asphalt Courses at Purdue

Civil Engineering instructors and faculty who participated in Purdue courses in asphalt paving technology and instruction.

TWENTY-ONE civil engineering instructors and research personnel from a like number of engineering colleges and universities participated in Purdue University's 1956 summer program of advanced study in Asphalt Paving Technology and Construction. The graduate courses and seminars, made possible through a grant to Purdue by The Asphalt Institute and supplementary funds from the Highway Research Board, were conducted during June and July at Purdue's School of Civil Engineering under the direction of its Head, Professor K. B. Woods, and W. H. Goetz, Associate Professor of Highway Engineering.

The Asphalt Institute grant, for which funds were solicited by the American Petroleum Institute, also made possible the award of substantial grant-in-aid fellowships for instructors attending the session.

Lecture and laboratory courses on Bituminous Materials and Their Highway Uses, Design of Bituminous Mixes, and Highway Soils and Flexible Pavement Design comprised the regular schedule. Participants also attended a weekly seminar conducted by outstanding authorities in the field of highway engineering and asphalt pavement technology from all parts of the country.

James M. Lackey Retires

BY the retirement of James M. Lackey on June 30, 1956, for reasons of health, The Asphalt Institute lost the services of one of its most capable engineers. Mr. Lackey for the past three years held the post of Special Projects Engineer attached to Institute Headquarters at College Park following eight years as District Engineer at Los Angeles. A prolific writer and widely recognized authority on almost every subject pertaining to asphalt construction, he authored much of the technical literature the Institute has published through the years and now has in production. On behalf of all his Asphalt Institute friends and associates, the *Quarterly* wishes him years of happiness during his retirement.

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